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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/024,107	12/17/2001	Sami Haapoja	872.0105.U1(US)	3127
29683	7590	08/29/2006	EXAMINER	
HARRINGTON & SMITH, LLP 4 RESEARCH DRIVE SHELTON, CT 06484-6212			JAMAL, ALEXANDER	
			ART UNIT	PAPER NUMBER
			2614	
DATE MAILED: 08/29/2006				

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/024,107

Applicant(s)

HAAPOJA ET AL.

Examiner

Alexander Jamal

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 June 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-33 is/are pending in the application.
- 4a) Of the above claim(s) 21-23 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20,24-33 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. Based upon the submitted amendment (15 June 2006), the examiner notes that claims 1,8,15,25 have been amended, claims 21-23 have been cancelled and claims 26-33 have been added.
2. Examiner submits a set of rejections using the previously cited prior art and submits an additional set of rejections for independent claims 1,8,15,25,29.
3. Examiner notes newly discovered prior art patents to Sakuma (6212371) and Ezuriko (5444738) that teach channel selective equalization in mobile telephones.

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
2. Claims 1,8,15,25,27,29, rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

As per **claim 1**, the claim recites “in which the non-ideal operation of said RF filters is not compensated for another RF channel.... When the another RF channel is selected”. It is not clear which channel (selected or not selected) the ‘another RF channel’ refers to. For the purposes of examination, examiner assumes that the first

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‘another RF channel’ refers to a non-selected one and the second ‘another RF channel’ refers to a selected channel.

As per **claim 8**, similar to claim 1, the claim recites that compensation is not provided for at least a portion of the remainder when a channel from a portion of the remainder is not selected. It is not clear whether the portion of the remainder comprises the selected frequency channel. For the purposes of examination, examiner assumes that the first ‘portion of the remainder’ refers to the non-selected channels and the second ‘portion of the remainder’ refers to a group of channels from which a single channel is selected from.

As per **claim 15**, in the last line of the claim, it is not clear what ‘the other channels’ is referring to.

As per **claim 25**, the claim states that a first channel is ‘selected’ and then compensated for by the equalizer, while a second channel is ‘selected’ and then not compensated for. It is not clear whether the selecting is being done to indicate equalization or indicate non-equalization.

As per **claim 29**, similar to claims 1 and 8, claim 29 recites that ‘other channels’ are not compensated when ‘other channels’ are selected. It is not clear what group of channels the ‘other channels’ are (are they selected and compensated for or not selected?).

For the purposes of examination, examiner assumes claims 15, 25, and 29 refer to an equalizer that selectively compensates for only those channels that are ‘selected’.

As per **claim 27**, it is not clear whether the claims states that the 2nd transmit channel is closer to the 1st receive channel than the distance between any other transmit channel and the 2nd transmit channel, or the distance between any other transmit channel and the 1st receive channel.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. **Claims 1-11,13-23,25,29** rejected under 35 U.S.C. 103(a) as being unpatentable over Abdelgany et al. (6584090), and further in view of Shalom et al. (6166601) and further in view of Abdelmonem et al. (6622028).

As per **claims 1, 8, 29**, Abdelgany discloses a transceiver comprising a transmit path and receive path (Fig. 4). Both paths comprise RF filters (164,92,168,98,176,78,74,156 ect.). The system is a CDMA system with frequency band channels. The device further comprises antenna 22 coupled to both the transmit and receive paths. However, Abdelgany does not disclose circuitry to selectively compensate selected channels for the non-linearity of both transmit and receive RF filters.

Shalom discloses a transceiver that applies digital equalization to the RF amplifier and associated components in order to produce highly linear amplification (Col 3 lines

29-65). The equalization (predistortion) is applied by equalizer 104 (Fig. 3) on the signal to be transmitted (via antenna 38) (Col 7 line 62 to Col 8 line 9). Shalom discloses that the equalization can be performed to correct non-linearities on the power amplifier or any other circuitry of amplifier 100 (Fig. 3, Col 7 line 61 to Col 8 line 10). Examiner reads the circuitry of amplifier 100 as an RF filter that passes a band of frequencies. The equalizer will operate on any frequency band channel to be transmitted. Examiner reads any frequency band signal that is present in the transmitter path to be 'selected'.

Examiner additionally notes the phrase 'when the at least one RF channel is selected' in applicant's claim 1. In the case that all channels are 'selected' then all channels will be equalized and the full bandwidth equalization of Shalom will read on claim 1. Examiner notes that claims 8 and 29 also recite that at least one signal may be selected. It would have been obvious to one of ordinary skill in the art at the time of this application to implement digital equalization for both the transmit and receive amplifiers and associated circuitry (the amplifier and circuitry inherently comprise RF filter because they have an impedance that has a certain frequency response at RF frequencies) for the advantage of producing a highly linear response from the circuit.

Abdelmonem discloses a transceiver (Col 3 line 60 to Col 4 line 15) and teaches that an equalizer may be used to compensate for the received signal that is subject to the non-linear behavior of the receive RF filters (Col 5 line 58 to Col 6 line 5) in wide channel systems such as W-CDMA. As in the case of Shalom, the examiner additionally notes the phrase 'when the at least one RF channel is selected' in applicant's claim 1. In the case that all channels are 'selected' then all channels will be equalized and the full

bandwidth equalization of Abdelmonem will read on claim 1. It would have been obvious to one of ordinary skill in the art at the time of this application to implement digital equalization in the transceiver for the advantage of compensating for nonlinear filter effects.

As per **claims 15,20,25**, claims rejected for the same reasons as claim 1.

Examiner reads 'selected' channels as those channels for which the compensation is necessary. Examiner notes the non-linearity is frequency dependant and as such, one skilled in the art would only apply equalization to those frequencies that produce a non-linear response. Examiner reads a 'selected channel' as a signal that produces a non-linear response from the driver circuitry and requires equalization to correct. The 'selected' channels will be compensated for and the 'non-selected' channels will not be equalized because they have no non-linear response to correct.

As per **claims 2,3,9,10**, the device of the claim 1 rejection would compensate for all transmit and receive channels.

As per **claim 17**, Abdelgany discloses that the transceiver may be a direct conversion receiver.

As per **claims 4,5,11,16,30**, the device comprises an FIR which is a DSP (SHALOM: Col 3 lines 45-65, Col 7 line 62 to Col 8 line 9). The equalization circuit functions by changing coefficients in the equalizer.

As per **claims 6,7,13,14,18,19**, Abdelmonem discloses that the system may be a W-CDMA system, which has the same ranges of transmit and receive frequencies as specified in claim 6.

As per **claims 26,27,32,33**, the channels are 'selected' based on whether they produce an unacceptable non-linear response from the processing circuitry of the transmit and receive paths. As such, any set of channels may be 'selected' including a 1st receive channel and a 2nd transmit channel or any combination of channels.

As per **claim 28**, the transmit signals all follow the transmit path (including any filtering stages along the way) and the receive signals follow the receive path (including any filtering stages along the way).

As per **claim 31**, Shalom discloses that the transmitted signal is digitally pre-distorted (as per the claim 1 rejection).

6. **Claims 12,24** rejected under 35 U.S.C. 103(a) as being unpatentable over Abdelgany et al. (6584090) in view of Shalom et al. (6166601) in view of Abdelmonem et al. (6622028) and further in view of Lindoff (6373888).

As per **claim 12**, Abdelgany, Shalom et al. (6166601) and Abdelmonem disclose the use of an equalizer implemented in an FIR filter, but they do not disclose that the number of taps may be varied in compensating for the transmit and receive signals.

Lindoff discloses an equalizer that has a variable amount of taps (ABSTRACT,). Lindoff teaches that a variable number of taps allows the equalizer to be adapted as a function of channel response and allows processing and power savings (Col 4 lines 15-40). It would have been obvious to one of ordinary skill in the art at the time of this

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application to implement a variable number of taps for the equalizer filter for the advantage of power and processor savings.

As per **claim 24**, Shalom Fig. 3 has no up or down converting of the received signal, as such the signal is processed (equalized) in a digital baseband.

2nd set of claim rejections for claims 1,8,15,25,29

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1,8,15,25,29 rejected under 35 U.S.C. 103(a) as being unpatentable over Abdelgany et al. (6584090), and further in view of Abdelmonem et al. (6622028) and further in view of Uddenfeldt et al. (5212803).

As per **claims 1,8,15,25,29**, Abdelgany discloses a transceiver comprising a transmit path and receive path (Fig. 4). Both paths comprise RF filters (164,92,168,98,176,78,74,156 ect.). The system is a CDMA system with frequency band channels. The device further comprises antenna 22 coupled to both the transmit and

receive paths. However, Abdelgany does not disclose circuitry to selectively compensate only selected channels (a subset of the total set of transmit and receive channels) for the non-linearity of both transmit and receive RF filters.

Abdelmonem discloses a transceiver (Col 3 line 60 to Col 4 line 15) and teaches that an equalizer may be used to compensate for the received signal that is subject to the non-linear behavior of the receive RF filters (Col 5 line 58 to Col 6 line 5) in wide channel systems such as W-CDMA. It would have been obvious to one of ordinary skill in the art at the time of this application to implement digital equalization in the transceiver for the advantage of compensating for nonlinear filter effects of all the RF filters used in Abdelgany.

Uddenfeldt teaches that equalizers used in mobile phones cause a large amount of power consumption (Col 1 lines 45-50). He teaches that channels (Col 3 lines 5-23) can be monitored and each channel can (once selected) be equalized. The other channels are not equalized while the selected channel is being equalized (Fig. 4, Col 4 lines 30-50, Col 6 lines 15-30). The system checks each channel with and without equalization. It would have been obvious to one of ordinary skill in the art at the time of this application to implement the selective measuring and equalizing taught by Uddenfeldt for the purpose of detecting which channels required equalization and allowing a power savings by not having the equalizer active for all channels at all times.

Response to Arguments

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3. Applicant's arguments with respect to claims 1-33 have been considered but are moot in view of the new ground(s) of rejection. Examiner notes the following responses to applicants arguments.
8. Applicant's arguments have been fully considered but they are not persuasive.

As per applicant's arguments (remarks page 12) that Shalom does not teach to implement equalization for filter induced distortion responsive to RF channels, examiner disagrees. Examiner further notes that the RF amplifier is read as comprising an RF filter (the frequency response of the amplifier and any associated circuitry with the amplifier- see Shalom Col 3 lines 35-37).

As per applicant's arguments that Shalom does not teach equalizing on the receive signal, examiner notes the cited Abdelmonem reference. Examiner further notes that one skilled in the art would know, in view of Shalom's (or Abdelmonem's) teachings that equalization could be used to compensate for non-linearities of any stages in the receive or transmit path.

1. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after

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the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alexander Jamal whose telephone number is 571-272-7498. The examiner can normally be reached on M-F 9AM-6PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Curtis A Kuntz can be reached on 571-272-7499. The fax phone numbers for the organization where this application or proceeding is assigned are **571-273-8300** for regular communications and **571-273-8300** for After Final communications.

AJ
August 15, 2006


CURTIS KUNTZ
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